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Langley Research Center

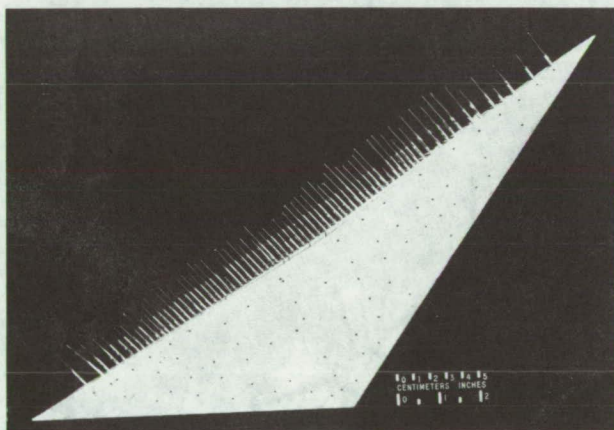


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Technique for the Integral Casting of Pressure Instrumentation in Wind-Tunnel Models

The problem:

The aerodynamic characteristics of wings or other surfaces are evaluated by wind-tunnel tests on small scale models. Much of the experimental data are pressure measurements taken through an array of orifices in the aerodynamic surface.



After the model is cast, it must be modified to allow the installation of tubing which connects each individual orifice to a pressure sensor. Machining channels to receive the tubing relieves internal stresses in the metal and results in warping and degradation of the specified aerodynamic shape. Alternately, the tubes serving the orifices in one surface of a model can be extended through the opposite surface, but this results in a model with only one useful surface.

The solution:

Cast the wind-tunnel model around a core consisting of an array of tubing.

How it's done:

The tubing array is designed to satisfy the instrumentation and the physical dimensions of the wind-tunnel model. The model (see fig.) is cast around the array core and finished to specifications. The model is then X-rayed to establish the precise locations of the individual tubes. Finally, using the X-ray, a template is constructed to assist in drilling the orifices.

In constructing the template, it is necessary to compensate for parallax in the X-ray. In addition, prior to drilling the orifices, the gap between the model and the template must be filled with a polyester resin to provide lateral support for the drill.

The principal advantage of this new technique is that a greater number of pressure orifices can be installed easily, without compromising the aerodynamic shape of the model. Initial feasibility studies indicate that this new technique can be used to reduce construction cost by approximately 50 percent.

Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
Langley Research Center
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Reference: B71-10247

(continued overleaf)

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to:

Patent Counsel
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